SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 18	PAGE 1
ENGINEERING AND COMPLIANCE DIVISION	APPL NO SEE BELOW	DATE 12/29/2009
PERMIT APPLICATION EVALUATION AND CALCULATIONS	PROCESSED BY GCR	CHECKED BY

PERMIT TO OPERATE EVALUATION

APPLICANT'S NAME: MM WEST COVINA, LLC

BUSINESS MAILING ADDRESS: FORTISTAR METHANE GROUP
3005 DOUGLAS BLVD, SUITE 105
ROSEVILLE, CA 95661
ATTN.: SUPARNA CHAKLADAR, TECH. DIR., ENV. SVCS.

PERMIT MAILING ADDRESS: SAME AS ABOVE

EQUIPMENT ADDRESS: 2210 S. AZUSA AVENUE
WEST COVINA, CA 91792

FACILITY ID: **113873**

Information pertaining to specific application's evaluation is listed on page No. shown below.

A/N 448958 (Prev. A/N 385201): (Refer to Pg. 1 through 8)

SUBJECT: MM West Covina LLC- P/O for A/N 448958
Change of condition for H2S content in LFG

On 9/21/05, MM West Covina submitted A/N 448958 for change of permit condition to allow for higher level of H2S content in landfill gas (LFG). [Also, at the same time, similar change of permit condition application, 448959, was submitted for existing gas turbine].The equipment is a steam generator (boiler) which is operating under PC 385201. Evaluation for PO was completed sometime back pending final review and approval. As the PO is pending approval, this new A/N 448958 for c/c will be processed to incorporate requested changes and a PO will be issued under A/N 448958. As a result, 385201 will be canceled.

This application supersedes previous PO evaluation under 385201 which is included in this folder for information. The proposed change of condition will have impact on SOx emission only, all other emissions remain same. There is no impact on risk.

SOx Emission:

Applicant has asked for higher level of H2S limit in LFG for operating flexibility and to avoid any potential future non-compliance with respect to SOx emission (In 2005, gas turbine SOx emission exceeded the permitted value, and c/c application is also submitted for gas turbine).

The applicant was asked to provide the most recent historical maximum H2S concentration for the LFG. On January 12, 2007, the applicant provided requested data for the year 2006 and estimated SOx emission (See E-mail with spreadsheet, dated Jan 12, 2007).

Boiler receives LFG from LBO header. 2006 data shows maximum H2S content (Lab data) = 49.3 ppmv.
May 17, 2005 S/T report, Boiler, shows H2S in LFG fuel = 68 ppmv (72.1 ppmv TRS = 68 ppmv as H2S). Therefore use 70 ppmv H2S.

LFG Btu content = 425 Btu/scf (May 2005 S/T)
Design rating for GT = 115 MMBtu/hr
LFG flow rate = (115 E+06) (1/425) (1/60) = 4510 scfm.
Assume that all of the H2S in LFG is combusted (oxidized) to SO2. (1 mole H2S → 1 mole SO2)

Max. SO2 emission = (4510) (70 E-06 ppmv H2S) (1/379)(1 lb mole SO2/1 lb mole H2S)(64)(60) = 3.2 lbs SO2/hr = 76.8 lbs/day.

Current PC 385201 SOx (as SO2) limit = 1.78 lbs/hr (Condition No. 8)

Net SOx increase for C/C = (3.20 – 1.78) = 1.42 lbs/hr = 34 lbs/day

The net SO2 increase (for c/c) for this equipment (source) is < 60 lbs/day, daily threshold limit under Rule 212(g).

However, two applications (448958 & 448959) are submitted the same day for change of condition that has impact on SOx emission for the facility. Rule 219 (c) and (d) section implies to the "project". Therefore, these applications can be considered as "project" and total net Sox emission increase > 60 lbs/day is subject to Rule 212 (g) notification, along with initial Title V facility permit.

Estimated net SOx emission increase = 34 (boiler) + 49 (gas turbine) = 83 lbs/day, total.

Steam Generator (Boiler) Exhaust Flow rate Measurement:

After communicating with MM West Covina staff and AQMD source testing and monitoring staff, it was agreed that in lieu of exhaust flow metering device installation, exhaust flow rate can be calculated using EPA method 19 (F-Factor calculation). This will require LFG fuel flow meter accuracy verification based on Annual Relative Accuracy Tests Audit (RATA) data. As a result, the steam generator exhaust flow measurement permit condition, No. 11, is proposed to be revised as follows;

STEAM GENERATOR STACK EXHAUST FLOW RATE (DSCFM) SHALL BE CALCULATED AND RECORDED ON A 15-MINUTE BASIS USING EPA METHOD 19. FUEL FLOW METER ACCURACY SHALL BE VERIFIED BASED ON ANNUAL REALATIVE ACCURACT TEST AUDIT (RATA) REPORT.

PROPOSED PO EMISSIONS:

Final PO emissions are determined based on 2004 (385201 PO evaluation), 2005 and 2006 source tests results and selecting higher mass emission rate from the three values (and still below current PC values, except SOx).

Contaminant	385201 PC lbs/hr	2004 S/T lbs/hr*	2005 S/T lbs/hr**	2006 S/T lbs/hr***	**Prop. PO Emis. lbs/hr**
CO	3.0	0.96	0.03	0.03	**1.0**
NOX (AS NO2)	2.97	2.36	2.39	2.21	**2.4**
PM10	2.58	1.24	1.47	1.27	**1.5**
ROG (AS CH4)	1.92	0.17	0.47	0.06	**0.5**
SOX (AS SO2)	1.78	2.55	3.20	2.43	**3.20**

* 2004 Results adjusted from 87.1 MMBtu/hr (76%) to maximum 115 MMBtu/hr design rating. This is same as under previous 385201PO evaluation that was pending approval.
** 2005 S/T conducted at 105% of rated capacity, considered as max. rating.
*** 2006 results adjusted from 79 MMBtu/hr (69%) to maximum 115 MMBtu/hr design rating.

Recommendation:

Compliance with all applicable R & R's is expected.
A Permit to Operate for A/N 448958 is recommended per sample permit upon issuance of the Rule 212(g) and Title V public notice and completion of commenting period from other agencies and public. Upon PO approval, cancel A/N 385201.

APPLICATION NO. 385201:

RESOURCE RECOVERY SYSTEM CONSISTING OF:

1. LANDFILL GAS BLOWERS (2), HOFFMAN, 125 HP, 6600 SCFM CAPACITY, AND ONE 100 HP BLOWER.

2. STEAM GENERATOR, ZURN, 69,000 LB/HR STEAM OUTPUT AT 826 DEGREES F AND 625 PSIG, WATER TUBE - PRESSURIZED, 115,000,000 BTU PER HOUR INPUT, LANDFILL GAS FIRED AND A NATURAL GAS PILOT, WITH ONE COEN MODEL DAF LOW-NOX BURNER/O2 TRIM SYSTEM.

3. FORCED DRAFT FAN, CLARAGE, MODEL RHP 1640A, OR EQUIVALENT, 200 HP.

4. FLUE GAS RECIRCULATION WITH AN AUTOMATIC DAMPER.

5. STEAM TURBINE, MURRAY, MODEL RJD8-M20, MULTISTAGE EXTRACTION TURBINE, DRIVING A 7100 KW GENERATOR, WITH A WATER COOLED CONDENSER, TWO (2) CONDENSATE PUMPS, A STEAM JET AIR EJECTOR/GLAND STEAM CONDENSER, SHELL AND TUBE FEEDWATER HEATER, A DEARATOR, TWO (2) FEED WATER PUMPS.

Conditions:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT TO OPERATE IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITIONS AT ALL TIMES.

3. THIS EQUIPMENT SHALL BE OPERATED AND MAINTAINED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.

4. THE QUANTITY OF LANDFILL GAS BURNED IN THE STEAM GENERATOR SHALL BE CONTINUOUSLY MONITORED AND RECORDED (SCFM). THE EQUIPMENT TO BE USED TO MEASURE AND RECORD THE FLOW RATE SHALL BE APPROVED BY THE EXECUTIVE OFFICER AND PROPERLY MAINTAINED.

5. THE BTU CONTENT OF THE LANDFILL GAS BURNED IN THE STEAM GENERATOR SHALL BE CONTINUOUSLY MONITORED AND AT LEAST HOURLY AVERAGE BE RECORDED. THE EQUIPMENT TO BE USED TO MEASURE AND RECORD THE BTU CONTENT OF THE GAS SHALL BE APPROVED BY THE EXECUTIVE OFFICER AND PROPERLY MAINTAINED.

6. THE TOTAL HOURLY AVERAGE BTU HEAT INPUT OF THE LANDFILL GAS BURNED IN THE STEAM GENERATOR SHALL NOT EXCEED 115 MMBTU PER HOUR.

7. A CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS) SHALL BE OPERATED TO MEASURE THE STEAM GENERATOR STACK EMISSIONS FOR NOX, CO, AND O2 CONCENTRATIONS ON A DRY BASIS. IN ADDITION, THE SYSTEM SHALL CONVERT ACTUAL NOX AND CO CONCENTRATIONS TO CORRECTED NOX AND CO CONCENTRATIONS AT 3% O2 ,ON, A DRY BASIS, AND CONTINUOUSLY RECORD THE STACK NOX CONCENTRATION, STACK CO CONCENTRATION, STACK O2 CONCENTRATION, AND CORRECTED NOX AND CO CONCENTRATIONS AT 3% O2. THIS MONITORING SYSTEM SHALL COMPLY WITH THE REQUIREMENTS OF RULE 218.

8. THE EMISSIONS FROM THE STEAM GENERATOR SHALL NOT EXCEED THE FOLLOWING:

CONTAMINANT	LBS/HR.
ROG (AS CH4)	0.17
NOX (AS NO2)	2.36
SOX (AS SO2)	2.55
CO	0.96
PM10	1.24

9. THE OXIDES OF NITROGEN (NOx) CONCENTRATION FROM THE STEAM GENERATOR SHALL NOT EXCEED 21 PPMV, BY VOLUME, AVERAGED OVER FIFTEEN MINUTES, CALCULATED AT 3% O2, DRY.

10. THE CARBON MONOXIDE (CO) CONCENTRATION FROM THE STEAM GENERATOR SHALL NOT EXCEED 14 PPMV, BY VOLUME, AVERAGED OVER FIFTEEN MINUTES, CALCULATED AT 3% O2 DRY.

11. A CONTINUOUS MONITORING SYSTEM SHALL BE OPERATED AND MAINTAINED TO MEASURE AND RECORD THE STEAM GENERATOR STACK EXHAUST FLOW RATE.

12. THE AMOUNT OF NATURAL GAS BURNED IN THE PILOT OF THE STEAM GENERATOR SHALL NOT EXCEED 180 THOUSAND CUBIC FEET PER DAY.

13. ANY BREAKDOWN OR MALFUNCTION OF THIS RESOURCE RECOVERY SYSTEM RESULTING IN THE EMISSION OF RAW LANDFILL GAS SHALL BE REPORTED TO THE SCAQMD MANAGER OF TOXICS AND WASTE MANAGEMENT TEAM WITHIN ONE HOUR AFTER OCCURRENCE AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

14. LANDFILL GAS NOT UTILIZED BY THE STEAM GENERATOR SHALL BE COMBUSTED IN AIR POLLUTION CONTROL EQUIPMENT, SUCH AS THE FLARE SYSTEM, WHICH HAS BEEN ISSUED A VALID PERMIT TO CONSTRUCT/OPERATE BY THE SCAQMD.

15. SAMPLING PORTS SHALL BE PROVIDED IN THE STEAM GENERATOR EXHAUST DUCT, 8-10 DUCT DIAMETERS DOWNSTREAM AND 2 DUCT DIAMETERS UPSTREAM OF ANY FLOW DISTURBANCE. AT EACH LOCATION, TWO SAMPLING PORTS AT 90 DEGREE APART SHALL BE PROVIDED AND SHALL CONSIST OF TWO 4-INCH WELDED NIPPLES WITH CAPS. AN EQUIVALENT METHOD OF EMISSION SAMPLING AND SAFETY ACCESS SHALL BE PROVIDED BY THE APPLICANT.

16. THIS EQUIPMENT SHALL COMPLY WITH RULE 1150.1.

17. ALL RECORDS SHALL BE KEPT FOR A PERIOD OF AT LEAST FIVE YEARS IN A FORM APPROVED BY THE SCAQMD AND MADE AVAILABLE TO THE SCAQMD PERSONNEL UPON REQUEST.

BACKGROUND:

On 7/21/2001, MM West Covina LLC (Title-V Facility) was granted a Permit to Construct for the above equipment that had been modified. The existing steam generator is currently operating under P/O F19506, A/N 349805, issued on 02/09/1999. On April 29, 2004, personnel from King Air Quality Services and PES, INC., conducted the required source tests (Document No. MM-040429-Stm-Plt-Compliance.rpt, submittal date on report 7/02/2004). Selected pages from the S/T report, pertaining emissions and other parameters data, are included in folder.

EMISSIONS:

On September 21, 2004, source test report was submitted. S/T results were reviewed that are summarized below,

Inlet fuel (LFG) flow rate = 4536 scfm (Table 3, correct value is 4536 not 4336)
Inlet con., as Methane, = 3,484.5 ppmv = 40.0 lbs/hr (Table 3)
Total Reduced Sulfur (TRS) in fuel = 42.1 ppmv (Table 6)
Avg. BTU/SCF for fuel = 320 (from power plant printout)
Total Heat Input = (4536 scfm) (320 Btu/scf) (60 min/hr) = 87.1 MMBtu/hr (75.7% of of design max. rating 115 Btu/hr)**.**
Exhaust flow rate = 31,208 acfm (Table 1)
Exhaust flow rate = 16,472 dscfm (Table 1)
Stack Temperature = 376.8 Deg. F (Table 1)
Moisture content = 8.9%
CO2 = 14.87 %
Oxygen = 4.52 %
CO = 0.64 ppmv
CO @ 3% O2 = 0.64 ppmv x (20.9 – 3 % / 20.9 – 4.52% meas) = 0.7 ppmv.
Since measured value is less than 20% of full scale (0-50 ppmv), CO value of 10 ppmv is considered.

CO permit limit (at rated capacity of 115 mm Btu/hr) = 10 ppmv x 115/87.1 = **13.2 ppmv**.
CO at 3% O2 = 13.2 ppmv x (20.9 – 3 % / 20.9 – 4.52% meas) = 13.9 ppmv @ 3% O2.
CO = 16472 dscfm x 13.2 ppmv x 1/379 x 28 x 60 = **0.96 lbs/hr** = 23.0 lbs/day.

NOx permit limit (at rated capacity of 115 mm Btu/hr) = 13.66 ppmv x 115/87.1 = **19.7 ppmv**.
NOx @ 3% O2 = 19.7 ppmv x (20.9 – 3 % / 20.9 – 4.52% meas) = 20.8 ppmv @ 3% O2.
NOx = 16472 dscfm x 19.7 ppmv x 1/379 x 46 x 60 = **2.36 lbs/hr** = 56.6 lbs/day.

NMOC (as CH4) permit limit (at rated capacity of 115 mm Btu/hr) = 3 ppmv x 115/87.1 = **4.0 ppmv**.
NMOC at 3% O2 = 4.0 ppmv x (20.9 – 3 % / 20.9 – 4.52% meas) = 4.2 ppmv @ 3% O2.
NMOC (as Hexane) @ 3% O2 = 4.2 x 16/86 = **0.78 ppmv**
NMOC = 16472 dscfm x 4.0 ppmv x 1/379 x 16 x 60 = **0.17 lbs/hr** = 4.1 lbs/day.

NMOC Destruction Efficiency = 99.7%

SOx = 4536 scfm LFG x 42.1 ppmv x 1/379 x 64 x 60 = 1.93 lbs/hr
SOx permit limit (at rated capacity of 115 mm Btu/hr) = 1.93 lbs/hr x 115/87.1 = **2.55 lbs/hr** = 61.2 lbs/day

PM =PM10 permit limit (at rated capacity of 115 mm Btu/hr) = 0.0067 gr/dscf x 115/87.1 = = 0.0088 gr/dscf
PM=PM10 emission rate = (0.0088 x 16472 dscfm x 60) / 7000 gr/lb = **1.24 lbs/hr** = 29.8 lbs/day.

The following emission limits are used for Permit to Operate based on S/T results,

CONTAMINANT	LBS/HR
ROG (AS CH4)	0.17
NOX (AS NO2)	2.36
SOX (AS SO2)	2.55
CO	0.96
PM10	1.24

Modeling :

With respect to current P/O (F19506, A/N 349805) emissions limits, only SOx emission is estimated greater for this modification. The "net incremental" emission due to modification is 0.92 lbs/hr for SOx (from 1.63 to 2.55 lb/hr).
SOx : Total reduced Sulfur in LFG fuel (42 ppmv) is below Rule 431.1 limit of 150 ppmv. No modeling is required for SOx.

Offsets:

Facility is considered an Essential Public Service thus qualifying for offsets credits from the Priority Reserve account (Rule 1309.1).

HRA:

At P/C evaluation incremental risk was estimated at 1.34E-08 which is less than one in a million. However, actual ROG emissions based on S/T results (TNMOC = 0.17 lb/hr) is less than under current P/O limit of 1.75 lbs/hr. No further HRA analysis is required due to net emission reduction for ROG.

Also, ROG destruction efficiency was determined to be 99.7%, and ROG emission, as Hexane, is 0.78 ppmv @ 3% oxygen on a dry-basis (which is less than 20 ppmv as Hexane under Rule 1150.1)

CONCLUSION & RECOMMENDATION:

Compliance with all applicable Rules and Regulations is expected for this equipment. A Permit to Operate is recommended with conditions listed on pgs. 1 through 3.

EQUIPMENT DESCRIPTION: A/N 502057 (Refer to Pg. 9 through 17)

RESOURCE RECOVERY LANDFILL GAS (LFG) TO ENERGY SYSTEM CONSISTING OF:

1. TWO (2) COMPRESSORS, LFG, MYCOM, ROTARY-TYPE, 1,000 H.P. EACH (ONE STAND-BY).

2. TWO (2) HEAT EXCHANGERS WITH ASSOCIATED COOLING TOWER AND A REHEAT-HEAT EXCHANGER.

3. FILTER COALESCER AND A 3-MICRON PARTICULATE FILTER.

4. GAS TURBINE, SOLAR TAURUS, MODEL 60, LFG FIRED, 63 MMBTU PER HOUR, WITH EVAPORATIVE COOLER AND AN ELECTRIC STARTER, DRIVING A 5,700 KILOWATT ELECTRIC GENERATOR.

5. EXHAUST STACK, 5'-11" DIA. BY 34'-3" HIGH.

CONDITIONS:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED, UNLESS OTHERWISE NOTED BELOW.
   [RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
   [RULE 204]

3. THIS EQUIPMENT SHALL BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
   [RULE 204]

4. THIS EQUIPMENT SHALL BE FIRED ONLY WITH LANDFILL GAS.
   [RULE 204]

5. A FLOW INDICATING AND RECORDING DEVICE SHALL BE INSTALLED IN THE LANDFILL GAS SUPPLY LINE TO THE GAS TURBINE TO MEASURE AND RECORD THE QUANTITY OF LANDFILL GAS (IN SCFM) BEING BURNED.
   [RULE 1303(b) (1)-MODELING, 1303(b) (2)-OFFSET, RULE 1150.1]

6. THE TOTAL HEAT INPUT OF LANDFILL GAS BURNED IN THE GAS TURBINE SHALL NOT EXCEED 63 MM BTU PER HOUR (LHV @ 459 BTU/SCF). A LOG SHALL BE KEPT INDICATING THE TOTAL HEATING VALUE OF LANDFILL GAS BURNED IN THE GAS TURBINE BASED ON THE RECORDED FLOW RATE (SCFM) AND THE LATEST WEEKLY BTU CONTENT READING.
   [RULE 1303(b) (1)-MODELING, 1303(b) (2)-OFFSET]

7. WEEKLY READINGS OF THE BTU CONTENT OF LANDFILL GAS AT THE INLET TO THE GAS TURBINE SHALL BE TAKEN USING AN INSTRUMENT APPROVED BY THE SCAQMD. ALL RESULTS SHALL BE RECORDED.
[RULE 1303(b) (1)-MODELING, 1303(b) (2)-OFFSET]

8. ALL RECORDING DEVICES SHALL BE SYNCHRONIZED WITH RESPECT TO THE TIME OF THE DAY.
[RULE 204]

9. LANDFILL GAS NOT UTILIZED BY THE GAS TURBINE SHALL BE BURNED IN A LANDFILL GAS FLARING SYSTEM(S) AND/OR A BOILER, WHICH HAVE BEEN ISSUED A VALID PERMIT BY THE AQMD.
[RULE 1303(a) (1)-BACT, RULE 1150.1]

10 SAMPLING PORTS SHALL BE PROVIDED IN THE GAS TURBINE EXHAUST STACK, 8-10 DUCT DIAMETERS DOWNSTREAM AND 2 DUCT DIAMETERS UPSTREAM OF ANY FLOW DISTURBANCE. AT EACH LOCATION, TWO SAMPLING PORTS 90 DEGREES APART SHALL BE PROVIDED AND SHALL CONSIST OF 4-INCH WELDED NIPPLES WITH CAPS. SAFETY AND ADEQUATE ACCESS TO THE SAMPLING PORTS SHALL BE PROVIDED BY THE APPLICANT.
[RULE 217]

11 EMISSIONS FROM THE GAS TURBINE EXHAUST SHALL NOT EXCEED THE FOLLOWING:

CONTAMINANT	LBS/HR
CO	20.3
NOx (AS NO2)	6.42
PM (PM10)	1.22
TGNMOC (AS CH4)	0.42
SOX (AS SO2)	1.66

[RULE 1303(b) (1)-MODELING, 1303(b) (2)-OFFSET]

12 EMISSIONS OF OXIDES OF NITROGEN SHALL NOT EXCEED 25 PPMV, CALCULATED AT 15% O2, DRY BASIS, EXCEPT DURING PERIODS OF STARTUP AND SHUTDOWN NOT TO EXCEED 30 MINUTES PER INCIDENT.
[RULE 1303 (a) (1)-BACT, 1303(b) (1)-MODELING]

13. EMISSIONS OF CARBON MONOXIDE SHALL NOT EXCEED 130 PPMV, CALCULATED AT 15% O2, DRY BASIS, EXCEPT DURING PERIODS OF STARTUP AND SHUTDOWN NOT TO EXCEED 30 MINUTES PER INCIDENT.
[RULE 1303 (a) (1)-BACT]

14 THE GAS TURBINE SHALL REDUCE NON METHANE HYDROCARBON COMPOUNDS (NMOC) BY AT LEAST 98% BY WEIGHT OR REDUCE THE OUTLET NMOC CONCENTRATION TO LESS THAN 20 PPMV, DRY BASIS, AS HEXANE AT 3% OXYGEN. THE ANNUAL SOURCE TEST SHALL BE CONDUCTED TO DEMONSTRATE COMPLIANCE NO LATER THAN 45 DAYS AFTER THE ANNIVERSARY DATE OF THE INITIAL SOURCE TEST.
[RULE 1150.1]

15. MM WEST COVINA LLC SHALL CONDUCT A PERFORMANCE TEST, ANNUALLY, FOR THE FOLLOWING;

A. THE PERFORMANCE TESTS SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, A TEST OF THE INLET AND THE EXHAUST OF THE EQUIPMENT FOR:

a. METHANE
b. TOTAL NON-METHANE ORGANICS
c. OXIDES OF NITROGEN (EXHAUST ONLY)
d. CARBON MONOXIDE (EXHAUST ONLY)
e. PARTICULATES (EXHAUST ONLY)
f. HYDROGEN SULFIDE (INLET ONLY)
g. C1 THROUGH C3 SULFUR COMPOUNDS, SPECIATED (INLET ONLY)
h. CARBON DIOXIDE
i. TOXIC AIR CONTAMINANTS INCLUDING, BUT NOT LIMITED TO BENZENE, CHLOROBENZENE, 1, 2- DICHLOROETHANE, 1, 1-DICHLOROETHENE, DICHLOROMETHANE, TETRACHLOROETHYLENE, TETRACHLOROMETHANE, TOLUENE, 1,1,1- TRICHLOROETHANE, TRICHLOROETHYLENE, TRICHLOROMETHANE, VINYL CHLORIDE, AND XYLENE.
j. OXYGEN
k. NITROGEN
l. MOISTURE CONTENT
m. FLOW RATE
n. TEMPERATURE

B. A TEST PLAN SHALL BE SUBMITTED TO THE SENIOR MANAGER, REFINERY AND WASTE MANAGEMENT PERMITTING, NOT LATER THAN SIXTY (60) DAYS BEFORE THE PROPOSED TEST DATE AND SHALL BE APPROVED BY THE SCAQMD BEFORE THE TEST COMMENCES. THE PLAN SHALL INCLUDE THE PROPOSED OPERATING CONDITIONS OF THE EQUIPMENT DURING THE TEST, THE IDENTITY OF THE TESTING LABORATORY, A STATEMENT FROM THE TESTING LABORATORY CERTIFYING IT MEETS THE CRITERIA IN DISTRICT RULE 304 (1), AND A DESCRIPTION OF ALL SAMPLING AND ANALYTICAL PROCEDURES TO BE USED.

C. THE SCAQMD ENGINEER, REFINERY AND WASTE MANAGEMENT PERMITTING, SHALL BE NOTIFIED OF THE DATE AND TIME OF THE TEST AT LEAST 10 DAYS PRIOR TO THE TEST, OR WITHIN A TIME PERIOD AGREED UPON BY THE SCAQMD ENGINEER.
[RULE 1303(b) (1) AND (b) (2), 1401]

16 A CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) APPROVED BY THE EXECUTIVE OFFICER SHALL BE INSTALLED AND MAINTAINED TO MEASURE THE GAS TURBINE EXHAUST GAS CONCENTRATION FOR NOx AND O_2 . THIS SYSTEM SHALL INCLUDE EQUIPMENT THAT MEASURES AND RECORDS EXHAUST GAS NOx CONCENTRATION, CORRECTED TO 15 PERCENT OXYGEN ON A DRY BASIS.
[RULE 218, 1303(b) (1)-MODELING, 1303(b) (2)-OFFSET, 3004 (a) (4)]

17 ALL RECORDS SHALL BE KEPT FOR A PERIOD OF AT LEAST FIVE YEARS AND SHALL BE MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.
[RULE 3004 (a) (4)]

NOTE: For information purpose and future reference, please note that permit condition No. 6 has been revised from the recommended 45 mmbtu/hr heat input limit, and allowing to operate the equipment at the design rated capacity of 63 mmbtu/hr. Whereas hourly mass emissions rates, under condition No.11, are based on 45 mmbtu/hr heat input (about 71% of the rated heat input capacity). These mass emissions (specifically for CO and NOx) are based on approved source tests results and per written request by Fortistar Methane Group, October 30, 2009. Fortistar Methane Group states (e-mail of Nov. 17, 2009) that even at increased load on the turbine will be able to comply with the mass emission limits under the increased load condition as well. For further information please refer to the AQMD E-mail correspondences with Fortistar Methane Group.

BACKGROUND:

This application was submitted on 9-01-09 for modification to the existing LFG combustion turbine permit, F24431/ A/N 33247. This modification application was submitted as a result of Notice of Violation (NOV No. P51518, issued July 1, 2009) that states that on 4/29 and 5/6/08 Solar turbine exceeded NOx limit at 5.17 lb/hr (PO limit 4.46 lbs/hr) and CO at 18.9 lbs/hr (PO limit 14.79 lbs/hr). Mass emissions exceedances were acknowledged by Fortistar Methane Group (FMG) by a letter dated July 6, 2009 to David Jones, AQMD. Applicant is asking for increased NOx and CO mass emissions rate than listed under PO F24431 (See FMG letter of August 24, 2009 submitted with this application)..However, the proposed CO and NOx emissions rates were revised by FMG as shown in October 30, 2009 letter.

Facility inspection report (7/01/09) has shown historical source tests results indicating that NOx mass emission rate exceeded from 2005 through 2008, and CO mass emission rates exceeded in 2007 & 2008.

This is a Title V facility, pending issuance of an initial Title V facility.

HISTORY:

A/N 502057	New application for modification, 09/01/2009
A/N 448959	Application for change of permit condition, for increased SOx emission rate, 09/21/2005. Processing for this application was completed, pending subsequent review and approval.
A/N 339954	Application withdrawn by applicant that was for permit shield. Cancelled 3/06/2001.
A/N 333247	PO F24431 issued, 02/18/2000 – ACTIVE.

EVALUATION:

Previous evaluation under A/N 448959 for increased SOx emission is included in this folder, hence not repeated here (for information purpose it is shown below with outlined bordered text).

However, SOx, PM10, TNMOC emissions **have been revised** based on maximum heat input rate of 45 MMBTU/hr permit condition (1639 dscfm LFG, 459 Btu/scf), based on April 29, 2008 S/T data. CO and NOx emissions rates are also based on 45 MMBTU/hr.

Max. **SO_2** emission = (1639 dscfm LFG) (100 E-06 ppmv H2S) (1/379) (1 lb mole SO2/1 lb mole H2S) (64) (60)
= **1.66 lbs SO2/hr**
= 39.8 lbs/day.
Current PO F24431 Sox (as SO2) limit = 1.04 lbs/hr
Revised Net SOx increase for C/C = (1.66 – 1.04) = **0.62 lbs/hr = 14.9 lbs/day**

PM (PM_{10}) emission = **1.21 lbs/hr** (or 2.78E-03 gr/dscf) per May 6, 2009 S/T result. However kept same as current permit limit of **1.22 lbs/hr**.
= 29.3 lbs/day
TNMOC (as CH_4) emission @ 98% DRE = (1639 dscfm LFG) (1580 E-06 ppmv NMHC*) (1/379) (16) (60) (1.0 - 0.98)
= 0.13 lbs TNMOC/hr
= **Use higher value of 0.42 lbs/hr** per S/T results summary
=10.08 lbs/day.
* LFG fuel analysis for NMHC = 0.158 mole % = 1580 ppmv, April 30 & May 2, 2008 analysis.

NOx & CO EMISSIONS: (As proposed by Fortistar Methane Group, October 30, 2009 letter and calculations corrected as needed)

Initially, applicant had asked for increased NOx concentration emission from 25 ppmv to 32 ppmv, @ 15% O2. (Letter of August 24, 2009, with initial application submittal). However, this is a Title V facility, and GT must comply with current LAER of 25 ppmv NOx at 15% O2. Therefore, applicant had agreed to keep the current 25 ppmv limit, as listed under their current permit, F24431 (A/N 333247).

Upon request, FMG has confirmed (October 30, 2009 letter) that July, August and September 2009, CEMS data revealed compliance with NOx and CO concentration limits at 25 ppmv and 130 ppmv, respectively, both @ 15% O2.

Basis:
S/T conducted at LFG inlet flow rate = 1639 dscfm (3 Runs, April 29, 2008. See Tables for DRE calculations)
Measured Btu/ft^3 = 459 (April 30 & May 2, 2008 analysis)
Maximum Heat input rate = (1639 dscfm) (459 Btu/ft^3) (60)
= **45.1 MMBTU/hr** (71.6% of max rating of 63 MMBTU/Hr).
Maximum Exhaust flow rate = 50,779 dscfm (16.8% O2 per S/T date 4/29/2008)

CO = (50779 dscfm) (20.9 – 16.8/20.9-15.0) $\frac{(130\ E\text{-}06)}{379}$ (28) (60) = **20.30 lbs CO/hr**
= 487.2 lbs/day

NOx = (50779 dscfm) (20.9 – 16.8/20.9-15.0) $\frac{(25E\text{-}06)}{379}$ (46) (60) = **6.42 lbs NOx /hr**
= 154.1 lbs/day

Revised emissions rates for this modification,

CONTAMINANT	LBS/HR	CURRENT PO F24431
CO	20.3	14.79
NOx (AS NO2)	6.42	4.46
PM	1.22	1.22
TNMOC (AS CH4)	0.42	1.55
SOX (AS SO2)	1.66	1.04

SOx INFORMATION FROM A/N 448959: For Reference

BACKGROUND:

This application was submitted on 9-19-05 for change of permit condition for the existing gas turbine (GT) PO F24431 (A/N 333247). MM West Covina, the applicant, informed in a letter dated August 31, 2005, that the equipment had exceeded permitted SOx mass emission listed on the permit. This was revealed from the source test report dated June 17, 2005. As a result the applicant requests for the change of condition to revise SOx emission based on most recent landfill gas (LFG) total H2S content. There are no other changes or impact on emissions expected. A similar request for C/C is also submitted for the boiler (a/n 448958).

This is a Title V facility. As per District records (4/06/07) there are no NCs or NOVs for the facility.

Total Reduced Sulfur (as H2S) content for LFG:

The applicant was asked to provide the most recent historical maximum H2S concentration for the LFG. On January 12, 2007, the applicant provided requested data for the year 2006 and estimated SOx emission (See E-mail with spreadsheet, dated Jan 12, 2007).

Gas turbine receives LFG from LB1 header. 2006 data shows maximum H2S content (Lab data) = 98.8 ppmv, say 100 ppmv.
LFG Btu content = 345 Btu/scf (June 2005 S/T)
Design rating for GT = 63 MMBtu/hr
LFG flow rate = (63 E+06) (1/345) (1/60) = 3044 scfm.

EMISSION CALCULATIONS:

Assume that all of the H2S in LFG is combusted (oxidized) to SO2. (1 mole H2S → 1 mole SO2)
Max. SO2 emission = (3044) (100 E-06 ppmv H2S) (1/379) (1 lb mole SO2/1 lb mole H2S) (64) (60)
= **3.1 lbs SO2/hr**
= 74.4 lbs/day.
Current PO F24431 Sox (as SO2) limit = 1.04 lbs/hr (Condition No. 11)
Net SOx increase for C/C = (3.10 – 1.04) = **2.06 lbs/hr = 49.4 lbs/day**
The net SO2 increase from this equipment (source) is < 60 lbs/day, daily threshold limit under Rule 212(g).

However, two applications (448958 & 448959) are submitted the same day for change of condition that has impact on SOx emission for the facility. Rule 219 (c) and (d) section implies to the "project". Therefore, these applications can be considered as "project" and total net Sox emission increase > 60 lbs/day is subject to Rule 212 (g) notification, along with initial Title V facility permit.

Estimated net SOx emission increase = 34 (boiler) + 49 (gas turbine) = 83 lbs/day, total.
No change is expected in other criteria pollutants' emissions listed under current permit. No impact on risk.

RULES EVALUATION:

RULE 212: There are no schools within 1000' of source.

Estimated SOx net daily emission increase from the "project" consisting of two applications (448958-Boiler & 448959-Gas Turbine) for the change of condition for LFG H2S content, has been revised to ~~83~~ 49 lbs/day* total [Estimated net SOx emission increase = 34 (boiler) + ~~49~~ 15 (gas turbine) = ~~83~~ 49 lbs/day], is ~~>~~ < 60 lbs/day threshold limit under Rule 212(g).
* ~~83~~ 49 lbs/day is based on LFG for ~~63~~ 45 MMBTU/hr heat input rate per actual S/T condition.

Estimated CO net emission increase = 132.2 lbs/day (for this modification application)
< 220 lbs/day daily threshold, Rule 212 (g)
Estimated **NOx** net emission increase = **47.0 lbs/day** (for this modification application)
> 40 lbs/day daily threshold, Rule 212 (g)
PM emission rate is same as under current permit based on S/T result.
TNMOC (VOC) emission rate is less than current permit limit.

Rule 212(g) public notice is required (for net NOx increase), along with Title V public notice.

Compliance is expected upon issuance of the public notice and completion of commenting period for the regulating agencies and public.

RULE 218: CEMS is in service for many years. Compliance.

RULE 401: With proper operation, control and maintenance, equipment is expected to comply with this rule.

RULE 402: With proper operation, control and maintenance nuisance complaints are not expected from GT operation.

RULE 404: Gas turbine is exempt from provisions of this rule per 404 (c).

RULE 407: Compliance is expected with the 2000 ppmv CO limit. Exempt from SOx, 500 ppmv limit, per 407(c) (2) [compliance required for rule 431.1 for H2S limit in LFG].

RULE 409: Rule **c**ompliance with combustion contaminants con. of 0.1 grains/cu. Ft. at 12% CO2, over 15 minutes is expected from other GTs permitted in the District.

RULE 431.1: Rule limit for H2S content in gaseous fuel (LFG) is 150 ppmv. Based on information provided by the applicant, recent 2006 data shows maximum H2S content of 98.8 ppmv (LB1 header). Compliance is expected.

RULE 474: This rule is not applicable since the turbine heat input rating is less than 555 MMBtu/hr and NOx emission will be < 300 ppmv limit.

RULE 475: This rule is not applicable since the turbine rating is less than 10 MW.

REGULATION IX: Standards of Performance for New Stationary Gas Turbines (40 CFR 60 Subpart KKKK)

Note: 40 CFR 60 Subpart KKKK supersedes Subpart GG.
Subpart KKKK is applicable to this equipment, as this application is filed for alteration/modification (Form 400-A)

NOx limit of 25 ppmv @ 15% O2 is required as LAER. This limit is more stringent than 96 ppmv required under subpart KKKK. Compliance is expected.

SOx emission is 0.54 lb/MWh < 0.90 lb/MWh limit under subpart KKKK.

Compliance with 40 CFR 60 Subpart KKKK is expected.

RULE 1134: This rule is applicable to only existing gas turbines, ≥ 0.3 MW, as of August 4, 1989. The Solar turbine was granted permit to construct in 1998. Not Applicable.

RULE 1150.1: No increase in VOC emission for this modification. Compliance is expected.

REG. XX: Regional Clean Air Incentive Market (RECLAIM)

This facility is exempt from RECLAIM per Rule 2001(i) (1) (C) – construction and operation of landfill gas control, processing or landfill gas energy recovery facilities, and such facility is prohibited from electing to enter RECLAIM.

REG XIII: This is a Title V facility. There will be net increase in CO and NOx emissions for this modification. Gas turbine will meet current LAER limits for CO (130 ppmv @15% O2) and NOx (25 ppmv @15% O2).

Applicant has provided SCREEN 3 air dispersion modeling analysis for NOx. Applicant was asked to revise and resubmit SCREEN 3 analysis as incorrect stack velocity was used (Input data used was based on dscfm instead of acfm at stack condition).
CO is in-attainment and therefore is not subject to modeling requirement but must meet current BACT/LAER standards).

SCREEN 3 modeling analysis was conducted for NOx using following parameters using May 6, 2008 S/T data (screen 3 input /output run is in folder)

Exhaust flow rate = 129,212 ACFM
Exhaust Temperature = 801.8 deg F. (700.67 deg K)
Stack diameter = 71.0 inches (1.803 m)
Stack Area = 2.553 sq. m.
Stack Velocity = 23.886 m/s
Stack Height = 34.25 ft. (10.44 m).
Ambient Temperature = 293 deg K
Modeling Emission rate = 1.0 lb/hr (0.1261 g/s)

Using simple terrain, 1-hr maximum ground level con. of 0.7508 $\mu g/m^3$ occurs at 214 m.

Conversion: 1 ppmv NOx = 1.8818 E+03 $\mu g/m^3$

NOx con. = 0.7508 $\mu g/m^3$ / 1881.8 $\mu g/m^3$ /ppm = 0.0025 ppmv (Source)
Max. 1-hr NOx back ground con. = 0.12 ppmv (2006=0.11, 2007=0.12 & 2008 = 0.11) for Station # 60
Source + BG NOx = 0.0025 + 0.12 = 0.1225 ppmv
CAAQS NOx 1-hr standard = 335 $\mu g/m^3$ / 1881.8 $\mu g/m^3$ /ppm = 0.178 ppmv NOx

NOx 0.1125 ppmv < 0.178 ppmv CAAQS. **PASS**

NOx avg. annual conc. = 4.82 $\mu g/m^3$ / 10 = 0.482 $\mu g/m^3$
NOx con. = 0.482 $\mu g/m^3$ / 1881.8 $\mu g/m^3$ /ppm = 0.00025 ppmv
(Project + BG) = 0.00025 + 0.0247 (2006-2008 avg)
= 0.025 ppmv < 0.053 ppmv (or 56 $\mu g/m^3$) CAAQS annual NOx standard. **PASS**

For SOx, BACT requirement is compliance with Rule 431.1. Since H2S content in LFG will comply with Rule 431.1 limit, compliance with BACT is expected.
No modeling is required for SOx.

Offsets are required from priority reserve, for the net emissions increase, as facility qualifies as Essential Public Service,

CO = 20.3 – 14.79 = 5.51 lbs/hr x 24 = 132 lbs/day (Exempt from offset, in-attainment).
NOx = 6.42 – 4.46 = 1.96 lbs/hr x 24 = 47.0 lbs/day
SOx = ~~3.10~~ 1.66– 1.04 = ~~2.06~~ 0.62 lbs/hr x 24 = 15.0 lbs/day (GT only)

NOTE: Public notice will address daily net NOx increase from GT.

RULE 1401: Exempt as there is no increase in VOC (TACs) for the modification.

RULE 1401.1: Exempt. This is an existing facility.

REG. XX: Regional Clean Air Incentive Market (RECLAIM)

This facility is exempt from RECLAIM per Rule 2001(i) (1) (C) – construction and operation of landfill gas control, processing or landfill gas energy recovery facilities, and such facility is prohibited from electing to enter RECLAIM.

REG. XXX: Title V

This is a Title V facility. A public notice (combined with Rule 212 g) is required prior to issuance of initial TV facility permit.

CONCLUSIONS/RECOMMENDATION:

A permit to operate is recommended upon completion of 45-day EPA review and commenting period from other agencies and the public. Then, the Title V facility permit shall be issued under A/N 339952.

A/N 339952: Initial Title V Permit Application

Background:

MM West Covina, LLC, submitted application 339952 for initial Title V facility permit on 3/10/1998. The facility operates a landfill gas (LFG) fired boiler and a gas turbine to generate about 13 MW of electricity. The facility is located at a closed landfill (BKK Landfill) that provides landfill gas. The proposed initial Title V permit includes the following equipment,

SECTION D: Permits to construct and permits to operate

Application No.	Permit to Operate No.	Equipment Description
333247	F24431	TURBINE ENGINE (5.7 MW) LANDFILL GAS
349805	F19506	BOILER (115 MMBTU/HR) LANDFILL GAS
448958	TBD will supersede F19506	BOILER (115 MMBTU/HR) LANDFILL GAS
502057	TBD will supersede F24431	TURBINE ENGINE (5.7 MW) LANDFILL GAS

For additional information and permit evaluation please refer to the attached evaluation prepared for the EPA review. Facility's brief history and most recent reported emissions are listed under permit summary page.

Rules Evaluation:
Compliance with applicable rules and regulations is expected.

Conclusions & Recommendations:
Issue the initial Title V permit for the facility upon completion of Rule 212 & Title V public notice issuance, 45-day EPA review, and public and other governmental agencies' commenting period.